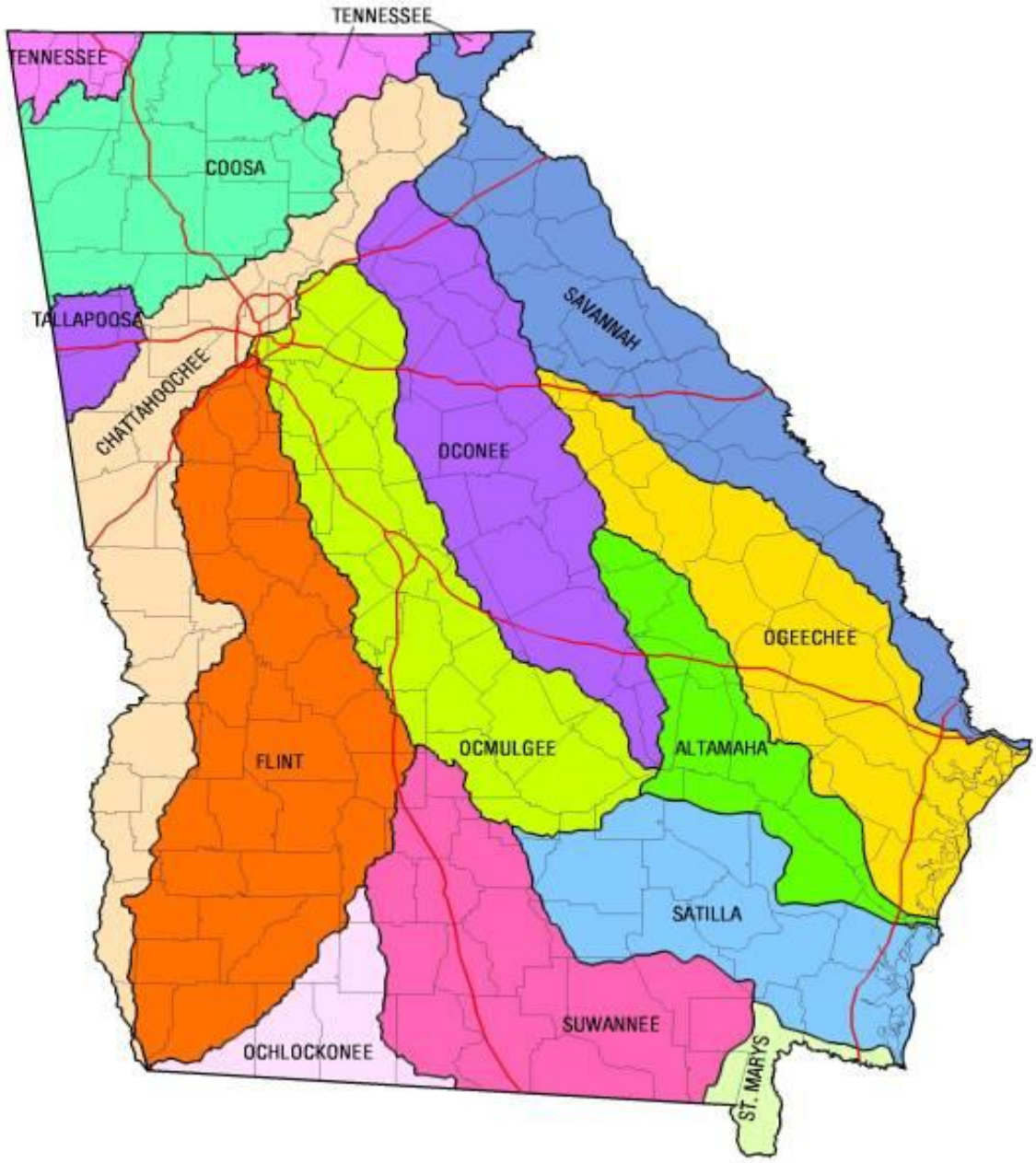
WATER QUALITY IN GEORGIA 2012-2013



Georgia Department of Natural Resources
Environmental Protection Division

WATER QUALITY IN GEORGIA 2012-2013

Preface

This report was prepared by the Georgia Environmental Protection Division GAEPD, Department of Natural Resources, as required by Section 305(b) of Public Law 92-500 (the Clean Water Act) and as a public information document. It represents a synoptic extraction of the EPD files and, in certain cases, information has been presented in summary form from those files. The reader is therefore advised to use this condensed information with the knowledge that it is a summary document and more detailed information is available in the EPD files.

This report covers a two-year period, January 1, 2012 through December 31, 2013. Comments or questions related to the content of this report are invited and should be addressed to:

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CHAPTER 1
Executive Summary

Purpose

This report, *Water Quality in Georgia, 2012-2013*, was prepared by the Georgia Environmental Protection Division (GAEPD) of the Department of Natural Resources (DNR). The DNR Coastal Resources Division (CRD) and Wildlife Resources Division (WRD), the Georgia Forestry Commission, the Georgia Environmental Finance Authority, and the Georgia Soil and Water Conservation Commission also contributed portions of the report. In addition, water quality data was provided by a number of governmental agencies, environmental groups and universities.

This report is often referred to as the Georgia 305(b) Report as portions of the report are prepared to comply with this section of the Federal Clean Water Act. The report describes water quality conditions of navigable waters across the State. The United States Environmental Protection Agency (USEPA) uses the individual State reports to develop a national water quality inventory report, which is transmitted to the Congress of the United States.

This report provides an assessment of the water quality conditions of surface and groundwater in Georgia and includes a description of the nature, extent, and causes of documented water quality problems. This assessment of water quality problem areas serves as the basis for lists required by Sections 303(d), 314, and 319 of the Clean Water Act. The report also includes a review and summary of ongoing statewide water planning efforts; wetland, estuary, and coastal public health/aquatic life issues; and water protection, groundwater, and drinking water program summaries.

In addition to complying with the Federal Clean Water Act, the major objective of this report is to provide Georgians a broad summary of information on water quality and the programs being implemented by the GAEPD and its partners to protect water resources across the State.

Watershed Protection In Georgia

The GAEPD is a comprehensive environmental agency responsible for environmental protection, management, regulation, permitting, and enforcement in Georgia. The GAEPD has for many years aggressively sought most available program delegations from the USEPA in order to achieve and maintain a coordinated, integrated approach to environmental management. Today the GAEPD administers programs for planning, water pollution control, water supply and groundwater management, surface water allocation, hazardous waste management, air quality control, solid waste management, strip mining, soil erosion control, geologic survey activities, radiation control, underground storage tanks, and safe dams.

The Watershed Protection Branch of the GAEPD, in cooperation with many local, state, and federal agencies, coordinates programs to address most aspects of drinking water supply and water pollution control including: comprehensive statewide water planning; monitoring; water quality modeling to develop wasteload allocations and total maximum daily loads (TMDLs); TMDL implementation; the continuing planning process; water quality standards; local watershed assessment and watershed protection plans; nonpoint source management; erosion and sedimentation control; stormwater management; Clean Water State Revolving and Georgia Fund Loan programs; the NPDES permit and enforcement program for municipal and industrial point sources; water withdrawal and drinking water permits; water conservation; source water protection; industrial pretreatment; land application of treated wastewater; regulation of concentrated animal feedlot operations (CAFOs); and public outreach including Georgia Project Wet and Adopt-A-Stream programs.

The GAEPD has designated the Georgia Soil and Water Conservation Commission as the lead agency for dealing with water quality problems caused by agriculture. The Georgia

Forestry Commission has been designated by the GAEPD as the lead agency to deal with water quality problems due to commercial forestry operations.

Watershed Protection Programs

Background. Georgia is rich in water resources. The State has approximately 44,056 miles of perennial streams, 23,906 miles of intermittent streams, and 603 miles of ditches and canals for a total of 70,150 stream miles. The State also has 4.8 million acres of wetlands (9% tidally affected), 425,582 acres of public lakes and reservoirs, 854 square miles of estuaries, and 100 miles of coastline. This rich water heritage is often taken for granted. However, unusual events such as the flood in the summer of 1994 and drought conditions experienced throughout Georgia in 1986, 1988, 1999-2002, and 2007-2008 serve as reminders that water resources cannot be taken for granted and sound regulatory programs are necessary to protect these resources.

In 2012-2013, the GAEPD placed emphasis on comprehensive statewide water management planning, monitoring and assessment, water quality modeling and TMDLs, TMDL implementation, State revolving and Georgia Fund loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control and public participation projects.

Comprehensive State-wide Water Management Planning. In 2004 the Georgia General Assembly passed new water planning legislation to take the place of river basin planning. The 2004 Comprehensive State-wide Water Management Planning Act called for the preparation of a comprehensive statewide water plan and provided fundamental goals and guiding principles for the development of the plan. The Statewide Water Plan was completed in 2008 and the Regional Water Councils completed plans in 2011. This work is discussed in Chapter 2.

Watershed Projects. The GAEPD is working with USEPA and South Carolina on several Savannah River projects; with the USEPA and the Alabama Department of Environmental Management (ADEM) on water quality issues in the Coosa River and Lake Weiss; and with the Florida Department of Environmental Protection and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin. Georgia is also working with Alabama and Florida, in cooperation with the Corps of Engineers, to develop agreements regarding the use of waters in the ACF and ACT River systems. This work is discussed in Chapter 7.

Monitoring and Assessment. Georgia's waters are currently designated as one of the following water use classifications: drinking water, recreation, fishing, coastal fishing, wild river, or scenic river. Specific water quality standards are assigned to support each water use classification. The quality of Georgia's waters is judged by the extent to which the waters support the uses (comply with standards set for the water use classification or designations) for which they have been designated. Water quality standards, monitoring programs, and information on assessments of Georgia's waters are discussed in Chapter 3. GAEPD's wetland monitoring program is discussed in Chapter 4 and estuary and coastal programs are discussed in Chapter 5.

Water Quality Modeling/Wasteload Allocation/TMDL Development. The GAEPD conducted a significant amount of modeling in 2012-2013 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). In 2011, TMDLs were developed for segments on the Georgia 2010 303(d) list for the Altamaha, Ocmulgee, and Oconee River Basins and these TMDLs were finalized and submitted to EPA and approved in early 2012. In 2012, TMDLs were developed for segments on the Georgia 2012 303(d) list for the Chattahoochee and Flint River Basins. These TMDLs were finalized and submitted to EPA and approved in early 2013. In 2013, TMDLs were developed for segments on the 2012 303(d) list for the Coosa, Tallapoosa, and Tennessee River Basins. Over the 2012-2013 period, 33 TMDLs were developed. To date more than

1480 TMDLs have been developed for 303(d) listed waters in Georgia. This work is discussed in Chapter 7.

TMDL Implementation. As TMDLs are developed, plans are needed to guide implementation of pollution reduction strategies. TMDLs are implemented through changes in NPDES permits to address needed point source improvements and/or implementation of best management practices to address nonpoint sources of pollution. TMDL implementation is discussed in Chapter 7.

Clean Water Revolving and Georgia Fund Loan Programs. In 2012-2013 more than 139 million dollars were obligated to communities for a variety of wastewater infrastructure and pollution prevention projects through the Georgia Environmental Finance Authority (GEFA) in the form of low-interest, SRF and Georgia Fund loans. The loan programs are discussed in Chapter 7.

Metro District Planning. The Metropolitan North Georgia Water Planning District (District) updated the comprehensive regional and watershed-specific plans to be implemented by local governments in the District in 2009. The EPD is charged with the enforcement of the District plans. State law prohibits the Director from approving any application by a local government in the District to issue, modify, or renew a permit, if such permit would allow an increase in the permitted water withdrawal, public water system capacity, or waste-water treatment system capacity of such local government, or any NPDES Phase I or Phase II General Stormwater permit; unless such local government is in compliance with the applicable provisions of the plan, or the Director certifies that such local government is making good faith efforts to come into compliance. This work is discussed in Chapter 7.

NPDES Permitting and Enforcement. Significant resources were allocated to wastewater discharge permit reissuance activities in 2012-2013. NPDES permits were modified or reissued to 105 municipal/private dischargers and to 44 industrial dischargers. Compliance and enforcement activities continued to receive significant attention in 2012-2013. By the end of 2013, of 205 major municipal discharges, 201 facilities were in general compliance with limitations. The remaining facilities are under compliance schedules to resolve the noncompliance or implementing infiltration/ inflow strategies. Enforcement action has been taken by the GAEPD to insure problems are alleviated. Of 39 major industrial discharges, all facilities were achieving permit compliance at the end of 2013.

The GAEPD utilizes all reasonable means to attain compliance, including technical assistance, noncompliance notification letters, conferences, consent orders, and civil penalities. Emphasis is placed on achieving compliance through cooperative action. However, compliance cannot always be achieved in a cooperative manner. The Director of the GAEPD has the authority to negotiate consent orders or issue administrative orders. In 2012-2013, 206 Orders were issued and a total of $988,606 in negotiated settlements was collected. This includes enforcement actions for all aspects of the water protection program including violations of the Georgia Water Quality Control Act, the Federal Clean Water Act and NPDES permits, with the exception of stormwater violations. In 2012-2013 a total of 168 stormwater Orders were issued and a total of $954,616 in negotiated settlements was collected. Permitting, compliance and enforcement work is discussed in Chapter 7.

Concentrated Animal Feeding Operations. Georgia adopted rules for swine feeding operations in 1999. Rules were adopted for animal (non-swine) feeding operations in 2001. During 2002 and 2003, rules were developed and implemented for large chicken feeding operations. Revisions of those rules, designed to reflect changes in the federal regulations and recent court decisions, are planned. Work was continued in 2012-2013 to implement this program. This process is discussed in Chapter 7.

Zero Tolerance. In response to a resolution adopted in 1998 by Georgia Department of Natural Resources that directed EPD to provide the "best quality of effort possible enforcing Georgia's environmental laws", a "zero tolerance" strategy was adopted for certain high growth areas of the state requiring enforcement action on any and all noncompliance issues. Significant work was conducted in 2012-2013 to implement this strategy. This process is discussed in Chapter 7.

Nonpoint Source Management Program. Nonpoint source management programs have allowed the GAEPD to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. The GAEPD is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and ground water and has been designated as the lead agency for implementing the State's Nonpoint Source Management Program. This program combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, non-governmental organizations and individual citizens.

Georgia's nonpoint source goals and implementation strategies are delineated in the State's Nonpoint Source Management Program. The Program is an inventory of the full breadth of current nonpoint source management activities (regulatory and non-regulatory) in Georgia.

The State's Nonpoint Source Management Program focuses on the comprehensive categories of nonpoint sources of pollution identified by the USEPA: Agriculture, Silviculture, Construction, Urban Runoff, Hydrologic/Habitat Modification, Land Disposal, Resource Extraction and Other Nonpoint Sources.

Under Section 319(h) of the Federal Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to the GAEPD to fund eligible projects, which support the implementation of the State's Nonpoint Source Management Program. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution of are made available annually to public agencies in Georgia. In FY12 – FY14, Georgia's Section 319(h) grant project funded 37 new projects for over $9 million. The nonpoint source programs are described in Chapter 7.

Stormwater Management. The GAEPD developed its Phase 1 Storm Water Permitting Strategy in February 1991. In 1994-1995 a total of 58 NPDES permits were issued to large and medium municipal separate storm sewer systems (MS4s). The 45 NPDES permits covering the Atlanta metro area were reissued in 1999, 2004, and 2009. EPD plans to reissued them again in 2014. The 13 NPDES permits for medium MS4s were reissued in 2000, 2005, 2010, and 2012.

Georgia's Phase II Storm Water Permitting Strategy was approved by USEPA in May 2000, and Phase II designation criteria was developed by GAEPD in July 2002 and 2013, corresponding to the 2000 and 2010 US Census population figures and urban area mapping. In December 2012, GAEPD reissued the NPDES General Permit for Phase II MS4s. This permit currently regulates 86 municapalities. Georgia expects to expand Phase II MS4 coverage based on the 2010 Census to 99 MS4s in 2014, with another 8 MS4s being designated but given the opportunity to evaluate their waiver potential under Federal waiver criteria. In 2009, a Phase II MS4 General NPDES Permit was issued to seven Department of Defense (DOD) facilities. Two of the bases closed in 2011, reducing the number of permitted DOD facilities to five. The NPDES Permit for these facilities will be reissued in 2014. In 2011, GAEPD issued a Phase II MS4 General Stormwater Permit to the Georgia Department of Transportation, which is applicable to post-construction runoff in jurisdictions with MS4 permits.

In 1993, a general NPDES permit for storm water associated with industrial activity was issued. This permit was most recently reissued in 2012, with approximately 2675 facilities retaining coverage. In addition, approximately

375 facilities have submitted an Industrial No Exposure Exclusion Certification Form. Stormwater management is discussed in Chapter 7.

Erosion and Sediment Control. The Georgia Erosion and Sedimentation Act was signed into law in 1975, and has been amended several times. The intent of the Act was to establish a comprehensive and statewide soil, erosion and sedimentation control to protect and conserve air, land and water resources through the adoption and implementation of local ordinances and programs which regulate certain land disturbing activities. EPD implements the program where there is no local ordinance. Erosion and sediment control work is discussed in Chapter 7.

Major Issues and Challenges

Georgia is one of the fastest growing states in the nation. Between 2000 and 2010, Georgia gained 1.5 million new residents, ranking 4th nationally. The increasing population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality, and assimilative capacity.

In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. Work was completed on the Statewide Water Plan and the plan was approved by the General Assembly and Governor Perdue in February 2008. Regional Water Councils and the Metro District were charged with the responsibility of developing water plans to provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the GAEPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

The regional water plans are not themselves an end. The plans present solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. The plans are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. The tools used to assess the capacities have been tested and refined, and will be further refined as the information for planning and management is improved. The process and results of regional planning, taken together, provide solid footing for plan implementation and the five-year review and revision required by the State Water Plan. Water users, water providers, local governments, state agencies, and elected leaders all have an important role in actions to ensure that Georgia's waters are sustainably managed to support the state's economy, protect public health and natural systems, and enhance the quality of life for all citizens.

Nonpoint Source Pollution. The pollution impact on Georgia streams has radically shifted over the last several decades. Streams are no longer dominated by untreated or partially treated sewage discharges which resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have returned and fish have followed. However, another source of pollution is now affecting Georgia streams. That source is referred to as nonpoint and consists of mud, litter, bacteria, pesticides, fertilizers, metals, oils, detergents and a variety of other pollutants being washed into rivers and lakes by stormwater. Even stormwater runoff itself, if rate and volume is unmitigated, can be extremely detrimental to aquatic habitat and hydrologic systems. Nonpoint source pollution, although somewhat less dramatic than raw sewage, must be reduced and controlled to fully protect Georgia's streams. Structural and nonstructural techniques such as green infrastructure, pollution prevention and best management practices must be significantly expanded to minimize nonpoint source pollution. These include both watershed protection through planning, zoning, buffer zones, and appropriate building densities as well as increased use of stormwater structural practices, low impact development, street

cleaning and perhaps eventual limitations on pesticide and fertilizer usage.

Toxic Substances. Another issue of importance, the reduction of toxic substances in rivers, lakes, sediment and fish tissue. This is extremely important in protecting both human health and aquatic life. The sources are widespread. The most effective method to reduce releases of toxic substances into rivers is pollution prevention, which consists primarily of eliminating or reducing the use of toxic materials or at least reducing the exposure of toxic materials to drinking water, wastewater and stormwater. It is very expensive and difficult to reduce low concentrations of toxic substances in wastewaters by treatment technologies. It is virtually impossible to treat large quantities of stormwater and reduce toxic substances. Therefore, toxic substances must be controlled at the source.

Nutrients. Nutrients serve a very important role in our environment. They provide the essential building blocks necessary for growth and development of healthy aquatic ecosystems. However, if not properly managed, nutrients in excessive amounts can have detrimental effects on human health and the environment, creating such water quality problems as excessive growth of macrophytes and phytoplankton, harmful algal blooms, dissolved oxygen depletion, and an imbalance of flora and fauna. In Georgia, site specific nutrient criteria have been adopted for several major lakes and their tributaries. Some of these lakes are currently listed for chlorophyll *a*, which is the primary biological indicator in lakes for nutrient overenrichment. TMDLs, based on watershed modeling, have been completed or are in development to address the nutrient issues for these lakes. Currently, the GAEPD is in the process of collecting the necessary data and information for use in developing nutrient standards for rivers, streams and other waterbodies in Georgia. Determining the relationship of nutrient levels and biological response is necessary in order to develop appropriate nutrient criteria.

Public Involvement. It is clear that local governments and industries, even with well-funded efforts, cannot fully address the challenges of toxic substances and nonpoint source pollution control. Citizens must individually and collectively be part of the solution to these challenges. The main focus is to achieve full public acceptance of the fact that what we do on the land has a direct impact on water quality. Adding more pavement and other impervious surfaces, littering, driving cars which drip oils and antifreeze, applying fertilizers and other activities and behaviors all contribute to toxic and nonpoint source pollution. If streams and lakes are to be pollutant free, then some of the everyday human practices must be modified. The GAEPD will be emphasizing public involvement; not only in decision-making but also in direct programs of stream improvement. The first steps are education and adopt-a-stream programs.

CHAPTER 2

Comprehensive State-wide Water Management Planning

Legislation

Georgia's future relies on the protection and sustainable management of the state's water resources. In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan.
The legislation assigned the responsibility for developing the draft plan to the Georgia Environmental Protection (GAEPD) and established a planning oversight committee, the Georgia Water Council, composed of legislators, legislative appointees, and state agency heads with water related responsibilities. The legislation called for the GAEPD to submit an initial draft plan to the Water Council for review no later than July 1, 2007 and for the Water Council to provide input and modify the draft plan as necessary and approve and recommend a final draft plan no later than the first day of the regular session of the 2008 General Assembly.

State Water Plan Development

The process used to develop the draft statewide water plan provided for meaningful stakeholder participation. A Statewide Advisory Committee (SAC) was convened to provide statewide perspectives on water policy options. Technical Advisory Committees (TACs) provided early input, when needed by answering specific technical questions needed to inform water policy options. Seven Basin Advisory Committees (BACs) were appointed to provide a regional perspective on proposed policy options and management practices.

The initial draft of the statewide water plan, "Georgia's Water Resources: A Blueprint for The Future" was submitted to the Water Council by the EPD on June 28, 2007.
The Water Council approved the release of the initial draft and established a portal for public input at its website. The Council discussed and approved a number of revisions to the initial draft plan and a second draft of the plan was prepared and noticed for public input on September 13, 2007.

The Water Council hosted thirteen public meetings across Georgia in November 2007 and received significant public comment on the draft plan. The input was thoroughly reviewed and each change approved by the Council was made in the draft plan. A third draft of the plan was completed and noticed for public comment on December 5, 2007. The Water Council hosted six public meetings to discuss the revised water plan. Public input was reviewed and changes approved by the Water Council were made and a final draft of the plan was approved by the Water Council. This proposed plan, "Georgia Comprehensive State-wide Water Management Plan", was transmitted to the Georgia General Assembly for consideration on January 14, the first day of the 2008 regular session.

The Georgia General Assembly debated the provisions of the draft water plan and both chambers approved the plan. Governor Perdue signed HR1022, the Statewide Water Plan, on February 6, 2008. A copy of the plan is available at www.georgiawaterplanning.org.

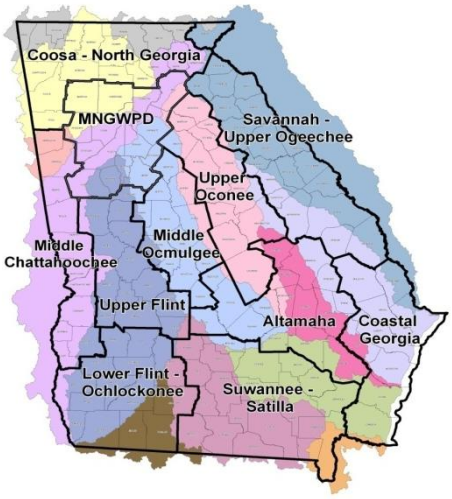
State Water Plan Implementation

Introduction. The State Water Plan ushered in a new era of comprehensive regional water planning for Georgia. Isolated regional water planning efforts aimed at addressing localized water challenges had been attempted in

several regions in Georgia since the early 1970s, but not until the 2004 directive from the Governor and Legislature had Georgia embarked upon statewide comprehensive regional water planning. The State Plan included several innovative concepts. One concept was the idea of appointing regional water planning councils whose responsibility would be to develop regional water plans. A second concept was the development of regional forecasts of water supply and assimilative capacity demands based on forecasts of population and employment for a region. A third concept was the development of water resource assessments to provide information to each Council on available water supply and assimilative capacity.

Regional Water Planning Councils. The regional water planning councils (Councils) represent regions in Georgia as designated in the State Water Plan and adjusted by approved petition. Each Council consists of individuals appointed by the Governor, Lt. Governor, and Speaker of the House. The Metropolitan North Georgia Regional Water Planning District, a separate water planning entity created by the legislature in 2001 will participate in the planning process consistent with the State Water Plan and its enabling legislation. A map of the water planning regions is shown below.

Final Delineation of Water Planning Regions



The role of the Councils is to prepare recommended Water Development and Conservation Plans (Regional Water Plans). These long-term regional water resource management plans will include resource assessments, estimates of current and future water needs, and those management practices necessary to meet the region's needs within the capabilities of the resources. *More detailed information on each individual regional water planning council can be found at* www.georgiawaterplanning.org.

Forecasts of Water and Wastewater Demands. In order for the Councils to produce regional water plans, forecasts of regional water and wastewater needs were required. Long-range population and employment projections were necessary inputs in order to forecast demand for regional municipal and industrial water and wastewater. Population and employment projections were provided to the regional water councils by the Governor's Office of Planning and Budget (OPB). Local governments and Councils were provided an opportunity to comment on the forecasts and the methodologies, assumptions, and data sources used to produce the projections. This input was considered prior to the use of the projections in the planning process. The information was then used in the preparation of water and wastewater demand forecasts for the following water use sectors: Municipal, Industrial, Agricultural, and Energy. The Councils received draft forecasts developed in10 year increments through 2050 for consideration and use in management practice selection. *More detailed information on the population and employment projections and on the water and wastewater demand forecasts can be found at* www.georgiawaterplanning.org.

Water Resource Assessments. Water resource assessments are also one of the foundational building blocks for regional water planning. The assessments included the compilation and analysis of data and modeling

to evaluate the capacity of water resources to meet current and future demands for water supply and wastewater discharge without unreasonable impacts.

The Georgia Environmental Protection Division, with the assistance of other state agencies, the University System of Georgia and other research institutions, the U.S. Geological Survey and contractors conducted water resource assessments to determine Surface Water Availability, Groundwater Availability, and Surface Water Quality (Assimilative Capacity).

In January and February 2010, assessments using current conditions for water use and wastewater discharge were provided to the regional water planning councils as a starting point for the development of recommended Regional Water Plans. More detailed information on the water resource assessments can be found at www.georgiawaterplanning.org.

Regional Water Planning Highlights 2009-2011

The following paragraphs are excerpted from the December 2011 report, "Georgia's Water Future in Focus: Highlights of Regional Water Planning 2009-2011" compiled by the GAEPD; full text available at www.georgiawaterplanning.org.

Introduction. In the three years since the adoption of the State Water Plan, more than 30.000 volunteer hours have been contributed and the State has invested $30 million in technical work and activities to support regional water planning. The Councils and the District have developed regional water plans that together provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the EPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

Local governments, utilities, industries, and other water users in each region will implement the plans, and plan contents will help guide state agency decisions on water permits and loans for water-related projects. The following paragraphs provide highlights from the eleven regional water plans. The full plans contain more in-depth information and can be reviewed at *www.georgiawaterplanning.org*.

Improving Information and Understanding Issues. Homes, schools, businesses, and farms all require water, and the wastewater generated by some water uses has to be safely discharged. Understanding the demands on our water resources is a critical first step in managing Georgia's waters for the future. Forecasts of water and wastewater demand were prepared to support regional water planning, providing this information on a consistent. Statewide basis for the first time. Understanding the capacities of water resources to meet the demands placed on them is also critical to managing water for the future. Over the past three years, the GAEPD led the development of groundwater sustainability models for the most-heavily used aquifers in the state, surface water availability models for the State's major river basins, and water quality models for many streams and most of the large lakes in the state.

Building on prior investments in monitoring and assessment of Georgia's waters, this technical work filled critical information gaps. Results were tested against the knowledge of the Council members who live and work in each region, providing feedback used to refine the tools. The Councils and other participants also identified additional improvements to enhance the models for future use.

Results of these assessments show that, in most regions, additional groundwater is available to meet current and future groundwater needs. Two areas do face

limitations on the availability of groundwater, the first is Southwest Georgia, where demand for groundwater exceeds the amount that can be sustainably withdrawn from the region's principal aquifer. The second area lies along the coast, where groundwater availability is limited by movement of saltwater into the principal aquifer. In these areas, additional demand for water will have to be met from surface water or from other aquifers.

For surface waters, results indicate that much of the state has sufficient water to meet future demands. In river basins with large reservoirs, existing surface water storage would help meet future needs if agreements allowing that use can be made with reservoir owners (U.S. Army Corps of Engineers and power companies).

In some other river basins, however, there may not be enough water during dry periods to meet demands for water and have stream flows above minimum thresholds. These results provide a warning that water consumption may impact uses that rely on water within the banks of streams, rivers, and lakes, such as boating and recreation. Actions to increase water conservation and water supply will be particularly important in these areas.

Most of the surface waters studied will be able to handle additional discharges of treated wastewater. Some discharges, however, may have to provide higher levels of wastewater treatment in order to protect water quality.

In all water planning regions, assessments identified water bodies that currently have poor water quality, often due to the pollutants carried by stormwater. Results also identify areas where pollutants carried in stormwater runoff may cause water quality problems in the future. Actions are needed to protect or restore water quality in these streams, rivers, lakes, and estuaries.

Meeting Georgia's Water Resource Challenges. The regional water plans highlight issues specific to individual regions. Examples include operation of federal reservoirs, protection of recreational uses on lakes, wastewater discharges in waters shared with neighboring states, and water quality issues associated with low levels of dissolved oxygen. Where applicable, the plans recognize the complementary activities that are underway to address these issues.

The regional water plans identify a range of actions or management practices to help meet the state's water challenges. In regions facing challenges with availability of surface water and groundwater, the plans recommend actions such as increasing water conservation and efficiency of use, master planning for local water systems, expanding or optimizing use of existing reservoirs, construction of new reservoirs where need and feasible, and shifting to alternate sources of water.

To address water quality challenges, some or all of the plans call for higher levels of wastewater treatment, master planning for local wastewater systems, improved floodplain management, and stream buffer protection, among other actions. The plans also identify strategies to address water quality problems that result from stormwater carrying pollutants into water bodies, including a funded nonpoint source management project in each region.

Implementing these plans is critical to meeting Georgia's water resource challenges. Local governments and others who develop water infrastructure and apply for permits, grants, and loans have a central role in plan implementation. State government also has an important role in supporting implementation, and, as emphasized in the plans, the success of implementation will rest, in large part, upon funding at state and local levels.

Continuing to improve data and information will also be important in meeting our water resource challenges. Over the past few years, the State made substantial investments in modeling tools and monitoring networks. However, information gaps and uncertainties still affected the Councils' ability to plan. The regional water plans all include specific actions

necessary to improve the tools and information used in water planning and management.

An on-going regional voice in water planning will be another key to meeting Georgia's water resource challenges. Given the progress and needs identified to date, all plans recommend State actions to support on-going activity by the Water Planning Councils.

Finally, the regional water plans recognize the activities underway to promote water conservation, improve operations of federal reservoirs, address water quality in waters shared with other states, resolve interstate disputes over water supply, and meet a number of other region-specific challenges. The strategies in the plans reflect these complimentary activities and will be implemented in concert with them.

In summary, the regional water plans are not themselves an end. The plans represent solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. They are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. The tools used to assess the capacities have been tested and refined, and will be further refined as the information for planning and management continues to improve. The process and results of regional planning, taken together, provide solid footing for plan implementation and the five-year review and revision required by the State Water Plan.

The investment in these assets will continue to pay off over time, advancing management of Georgia's water to support the state's economy, protect public health and natural systems, and enhance the quality of life for all citizens.

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